

DISCUSSION OF THE AMENDMENT

Claims 1-5 and 8-15 are active in the present application. Claims 6 and 7 are canceled claims. Independent Claim 1 is amended herein to require that the monomer component (ii) is trimethyl ammonium propyl acrylamide. Support for the amendment is found in the previously presented claims, e.g., wherein dimethylaminopropyl acrylamide is quaternized with a C₁ alkyl group.

No new matter is added.

REMARKS

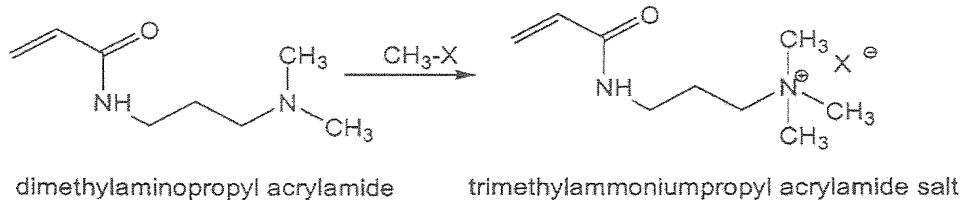
Applicants thank the Office for withdrawing the rejections over JP '405 of the previous Office Action.

The Office rejected Claim 1 as indefinite. The Office poses the question what Applicants intended by a quaternized material. The Office stated:

... do applicants intend dimethylaminopropyl acrylamide quaternized with a "salt" of a C₁ to C₃ alkyl or alkylene group or a benzyl group?

See page 3 of the Office Action of September 12, 2007.

Applicants submit that the Office's characterization of quaternized compounds is not clear. Dimethylaminopropyl acrylamide is not quaternized with a salt. Instead, when dimethylaminopropyl acrylamide is quaternized with, for example, a C₁ alkyl group, a salt is formed. This reaction is described diagrammatically below:

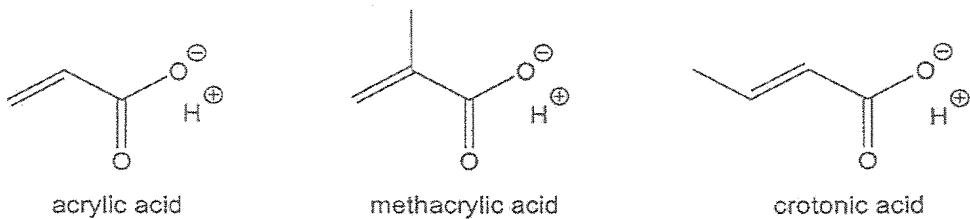


Regardless of this distinction, Applicants submit that the amendment to Claim 1 obviates the rejection on the ground of indefiniteness.

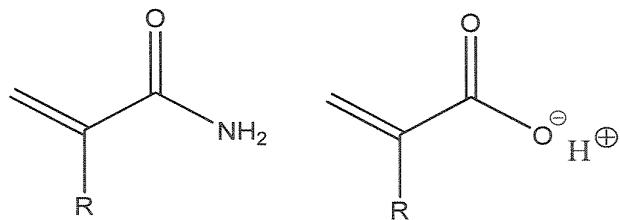
The Office asserts that the claimed invention is obvious over Sato (U.S. 5,776,362) or Takeda (U.S. 5,587,415). In the amendment filed in the present case on August 20, 2007, Applicants pointed out that Claim 1 recites a polymer that contains only the three monomers (i), (ii), and (iii) recited in the present claims. The compositions of Sato and Takeda are excluded from the presently claimed invention because the polymers of Sato and Takeda include monomer units that are not a part of the Markugh group of monomers recited in the present claims.

The Office appears to be of the belief that the polymers of Sato and/or Takeda are encompassed by the polymer of present Claim 1. Specifically, with regard to Sato, the Office states that the vinyl carboxylic acid monomer that is one monomer unit of the Sato polymer falls within the scope of monomers (ii) and (iii) of present Claim 1. Applicants submit that the vinyl carboxylic acid monomer unit of Sato is excluded from the polymer of the present claims. Applicants further submit that one of ordinary skill in the art would readily recognize that a vinylic carboxylic acid monomer is different from an acrylamide monomer.

Sato discloses that the prior art polymer must contain 10-45 mol% of a vinylic carboxylic acid monomer unit (see column 8, lines 13-14 of Sato). Sato describes examples of the vinylic carboxylic acid monomer in column 2, lines 52-56 where monomers such as acrylic acid, methacrylic acid and crotonic acid are disclosed. For reference, Applicants provide the structures of acrylic acid, methacrylic acid and crotonic acid below.



As stated above, an acrylamide is different from a vinylic carboxylic acid monomer unit. To show the difference between an acrylamide and, for example, acrylic acid, Applicants provide two structures below.



R=H: acrylamide
R=CH₃: methacrylamide

R=H: acrylic acid
R=CH₃: methacrylic acid

Applicants submit it is readily evident to those of ordinary skill in the art that an acrylamide is different from a vinylic carboxylic acid monomer unit. Where a carboxylic acid has a terminal OH group, an acrylamide has a terminal NH₂ group. These two classes of compounds are entirely different. Thus, the vinyl carboxylic acid monomer unit of Sato is not encompassed by the acrylamide component (ii) or the quaternized dialkylamino acrylate component (iii) of present Claim 1.

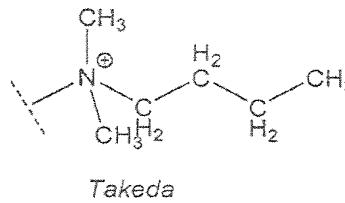
Component (iii) includes acrylate groups. Applicants submit that an acrylate group is not a vinylic carboxylic acid monomer unit. An acrylate group does not have a terminal OH group. Instead, an acrylate group has a terminal OR group where R is not H.

The Office admitted that the polymer of JP '405 is not encompassed by the polymer of the present claims because the present claims exclude the anionic vinyl monomer of JP '405. The anionic vinyl monomer of JP '405 is described to preferably methacrylic acid. Sato identifies methacrylic acid, already discussed above, as a vinylic carboxylic acid monomer unit. If the Office on the one hand acknowledges that the polymer of JP '405 is excluded from the presently claimed invention, the Office should also acknowledge that the polymer of Sato is excluded from the presently claimed invention for the same reason.

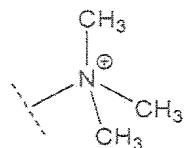
Sato further reinforces the distinction between the Sato polymer and the polymer of the present claims by noting that (meth)acrylamide is not a vinylic carboxylic acid monomer unit. Sato discloses that (meth)acrylamide is a nonionic vinyl monomer (see column 2, lines 52-61 of Sato). Because the vinylic carboxylic acid monomers are acids, or a salts of acids, they are necessarily ionic, e.g., different from an acrylamide.

With regard to the polymer of Takeda, the Office has taken the position that the butyl-substituted monomer of Takeda is a homolog of any C₃ alkyl substituted dimethylaminopropyl acrylamide, e.g., of component (ii) of the present claims.

Applicants submit that present Claim 1 is not obvious over Takeda at least because monomer component (ii) is not a homolog of the butyl-substituted compounds cited by the Office (see page 5 of the Office Action). The Office states that a homolog is a compound that differs by only one methylene linkage. Component (ii) of the present claims contains three terminal methyl groups and no C₂, C₃ or C₄ terminal alkyl group. The Office's assertion that there is any homology between the butyl derivative of the cited prior art and the trimethyl derivative recited in the present claims is therefore not supportable. A comparison of the structures of the Takeda butyl substituted material and the trimethyl material of the present claims is shown below for convenience.



Takeda



instant claim 1

In fact, Takeda expressly teaches away from monomers that are substituted with alkyl groups having less than three carbon atoms. For example:

Quaternary monomers obtained by the reaction of an alkyl halide having C₃ or lower carbon atoms are not suitable because the resulting polymer is partly soluble in the salt solution....

... It is a prerequisite for the process for realizing the present invention that the resulting copolymer is insoluble in the aqueous salt solution ...

See column 3, lines 49-52 and column 4, lines 8-10, respectively, of Takeda.

Takeda makes it explicitly clear that the monomer unit of the prior art must have at least a four carbon alkyl group. Takeda expressly discloses that using less than a four carbon alkyl unit will prohibit the resulting polymer from achieving the objectives of the prior art invention.

Applicants submit that Takedo's teaching away from the monomer component of the present claims shows that the rejection is not supportable and should be withdrawn.

The Amendment filed in the present case on August 20, 2007 included a discussion regarding the data disclosed in the original specification. The data showed that improved eco-performance may be obtained using the polymer of the present claims (i.e., a polymer consisting of the components (i), (ii), and (iii)). In response, the Office stated that the data do not show the criticality of the monomer composition of the present claims (see page 7 of the Office Action). Applicants point out that Sato discloses that the use of dehydrating agents that contain cationic polymers lead to problems in sludge dewatering (see column 1, lines 14-19 of Sato). Sato further discloses that the dehydrating agents may be improved if amphoteric polymers that comprise cationic vinyl monomer units, anionic vinylic carboxylic acid monomer units and nonionic vinyl monomer units are used (see column 1, lines 18-19, 35-40 and 42-47 of Sato).

The data of the present specification refute Sato's disclosure. The table below includes dewatering data for various terpolymers.

Polymer	Dosage (kg/t)	Filtration time
3	3.3	24
13	3.1	16
5	3.3	150
7	6.2	26
8	3.1 to 6.2	no flocculation

The terpolymers identified as polymers 3 and 13 of the table below are cationic terpolymers (inventive). In contrast, polymers 5, 7 and 8 are amphoteric polymers. The

cationic polymers according to the claimed invention provide shorter filtration times in comparison to the amphoteric polymer-containing compositions.

With respect to the toxicity data, neither of Sato nor Takeda disclose or suggest that improved eco-performance in the form of lower toxicity (e.g., lower environmental impact) can be obtained by using the polymer of the presently claimed invention. As Applicants have discussed above, the terpolymer of the present claims is different from the polymers of Sato and Takeda.

There is no evidence of record that polymers made from different monomer compositions would inherently have the same properties with regard to toxicity index. The Office's assertion that the prior art compositions would inherently have the same toxicity index is not supportable. This basis of the rejection should therefore be withdrawn and the claims allowed.

In the paragraph bridging pages 6 and 7 of the Office Action the Office refers to the dispersant of Takeda. The Office states that the Takeda dispersant is a cationic polymer. The dispersant of Takeda is not relevant to the composition of the polymers of the presently claimed invention.

REQUEST FOR REJOINDER

On finding allowable subject matter the office is requested to rejoin and allow Claims 11-13 which depend from Claim 1.

For the reasons discussed above in detail, Applicants submit that the rejections should be withdrawn and all now-pending claims allowed.

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Respectfully submitted,

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